DOCUMENT RESUME

ED 104 909 TM 004 360

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TITLE Seeking Markers for Temperament Factors among Positive and Negative Poles of Temperament Scales.
INSTITUTION Educational Testing Service, Princeton, N.J.
SPONS AGENCY Office of Naval Research, Washington, D.C. Personnel and Training Research Programs Office.
REPORT NO PR-74-22; TR-7
PUB DATE Dec 74
NOTE 32p.; For a related document, see TM 004 366

EDRS PRICE MF-$0.76 HC-$1.95 PLUS POSTAGE
DESCRIPTORS Correlation; *Factor Analysis; *Factor Structure; Individual Characteristics; Item Analysis; Personality Assessment; *Personality Tests; *Self Evaluation; Statistical Analysis
IDENTIFIERS *Temperament Factors

ABSTRACT

This report covers part of a project designed to develop and to make available to research workers markers for some of the temperament factors that have been established in the factor-analytic literature. An earlier report describes 28 such factors and defines several divisions of each factor, called subfactors, that appear in the literature to be associated with the factors. Each subfactor is described as a positive pole versus a negative pole. It was hypothesized that scales for these subfactors, when placed in a factor analysis, would have salient loadings on those factors for which they were intended to define one of the divisions. Scales comprised of newly constructed items were developed for each subfactor, half of the items representing each pole, and an equal number of those for each pole keyed "yes" and "no", in order to balance out the tendency to acquiesce. This report covers two factor analyses in which some of the subfactors were divided such that each pole was represented by a separate variable. By more fully determining some of the factors and by utilizing the extraction and rotation of several different numbers of factors, it is now possible to suggest markers in the form of unipolar scales for ten additional factors. The evidence used in making these suggestions is presented. (Author/RC)

ED104909

PR-74-22

SEEKING MARKERS FOR TEMPERAMENT FACTORS AMONG POSITIVE AND NEGATIVE POLES OF TEMPERAMENT SCALES

TM

John W. French and Diran Dermen

December 1974

Technical Report No. 7

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Research sponsored by the
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NR 150 329

Harry H. Harman
Principal Investigator

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Educational Testing Service
Princeton, New Jersey

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Educational Testing Service

Princeton, New Jersey

REPORT DOCUMENTATION PAGE

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1. REPORT NUMBER: Technical Report No. 7	2. GOVT ACCESSION NO.
3. RECIPIENT'S CATALOG NUMBER	
4. TITLE (and Subtitle): Seeking markers for temperament factors among positive and negative poles of temperament scales	5. TYPE OF REPORT & PERIOD COVERED: Technical Report
	6. PERFORMING ORG. REPORT NUMBER: PR-74-22
7. AUTHOR(s): John W. French and Diran Dermen	8. CONTRACT OR GRANT NUMBER(s): N00014-71-C-0117
9. PERFORMING ORGANIZATION NAME AND ADDRESS: Educational Testing Service, Princeton, New Jersey	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: NR 150-329
11. CONTROLLING OFFICE NAME AND ADDRESS: Personnel and Training Research Programs, Office of Naval Research (Code 458), Arlington, Virginia 22217	12. REPORT DATE: December, 1974
	13. NUMBER OF PAGES: 21
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)	15. SECURITY CLASS. (of this report): Unclassified
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

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This report covers part of a project designed to develop and to make available to research workers markers for some of the temperament factors that have been established in the factor-analytic literature. An earlier report describes 28 such factors and defines several divisions of each factor, called subfactors, that appear in the literature to be associated with the factors. Each subfactor is described as a positive pole versus a negative pole. It was hypothesized that scales for these subfactors, when placed in a factor

20. continued

analysis, would have salient loadings on those factors for which they were intended to define one of the divisions. Scales comprised of newly constructed items were developed for each subfactor, half of the items representing each pole, and an equal number of those for each pole keyed "yes" and "no", in order to balance out the tendency to acquiesce. Another earlier report covers two factor studies of these subfactor scales. Those studies revealed satisfactory markers in the form of subfactor scales for eight of the 28 factors. The present report covers two factor analyses in which some of the subfactors were divided such that each pole was represented by a separate variable. By more fully determining some of the factors and by utilizing the extraction and rotation of several different numbers of factors, it is now possible to suggest markers in the form of unipolar scales for ten additional factors. The evidence used in making these suggestions is presented.

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SEEKING MARKERS FOR TEMPERAMENT FACTORS AMONG POSITIVE AND NEGATIVE POLES OF TEMPERAMENT SCALES

John W. French and Diran Dermen

Introduction

The authors participated in the writing of a pool of self-report temperament items intended to make more available to research workers separate scales that would mark temperament factors that have been established in the literature. Establishment is defined here as the identification of factors with the same apparent psychological meaning in a minimum of three analyses performed by at least two different laboratories. A summary of the literature by French (1973) points out the establishment of 28 temperament factors. It presents meaningful divisions of the domain of each factor, so that reference can be made to these divisions in order to describe the factors in the studies being covered by the summary. These divisions are called "subfactors", and scales for them might serve as suitable factor markers.

Consequently, in order to generate factor markers for the use of research workers, a pool of items was constructed to build scales that would measure several subfactors for each of the 28 factors judged to have been established by the literature. For each subfactor 16 items were written, with four items for each of the following categories:

(a) A positive pole or interpretation, with answers keyed "yes".

(b) A positive pole or interpretation, with answers keyed "no".

(c) A negative pole or opposite interpretation, with answers keyed "yes".

(d) A negative pole or opposite interpretation, with answers keyed "no".

An equal number of items keyed "yes" and "no" were written so as to balance out the tendency of some subjects to acquiesce. The several 16-item scales for each factor were intended to cover the broadest conception of the factors as they were observed in the literature. It was anticipated that this effort to cover the full extensiveness of factors in the literature would cause some of the factors to overlap with one another. However, it was hoped that, in trial analyses, these sub-factor scales would be found to correlate sufficiently with one another so as to give rise to factors that could be readily identified as those found repeatedly in the literature as "first order" or "primary" factors.

Very clearly it was important to put these new items and scales to the test in factor studies, not only because newly constructed items can never be trusted prior to suitable analyses, but also because the factors, as they appear in the literature, often cover only a part of the total domain recognized as the factor, and often emphasize just one of the poles or directional interpretations, sometimes ignoring completely the opposite pole. This means that the definition of an opposite pole was sometimes left entirely up to a reasoned psychological understanding of the domain of the factor. For example, is "objectivity" a concept that is a true opposite of "paranoid tendency", and is "credit given by others" a true opposite of "blame given by others"? An appropriate number of items were written to represent opposite poles of this kind, even though there was not always any actual evidence in the factor literature to support the existence of such seemingly valid psychological opposites. The complete

list of 87 hypothesized markers for the 28 factors is presented in Table 1.

Analyses of Whole Scales

Factor analyses of the whole subfactor scales, including items representing both favorable poles and oppositely keyed negative poles, were reported on two samples by Dermen et al. (1974). One sample consisted of Naval recruits tested in overlapping groups, so that the numerous scale intercorrelations were actually based on different groups but never fewer than 100 subjects. Unfortunately, these men were not typical of many people that might use these reference tests. They had such trouble reading the items that it became necessary to read all of the items aloud during the testing period. However, reasonably high reliabilities computed from these data for most of the subfactor scales suggest that the subjects responded seriously to the items. The second sample included 153 female and 92 male college students.

Each of the scales of whole subfactors contained 16 items when first constructed, but, using the Navy data, items showing low or negative consistency with other items in the same scale were deleted. A few entire scales were deleted because of questionable reliability or the deletion of too many individual items. The variables used in both of these analyses were the scales remaining after making these deletions based on the Navy sample. These are the variables indicated under the "77" heading in Table 1. Items representing opposite poles or "ends" of the scales were combined and were keyed in such a way that all items contributed to measurement of positive strength on the subfactor.

TABLE 1

Variables Used in Different Analyses

Analysis[2] 22	Analysis[2] 38	Analysis[2] 77	Variable	Factor and Subfactor Scale Description[1]
			Ac	General Activity
			AcA	Moves rapidly, quick in physical performance vs. slow
		x	AcB	Busy, active in projects or nonsocial affairs vs. uninvolved, feels overburdoned
		x	AcC	Accomplishes things rapidly vs. indolent, unmotivated
			Ag	Agreeableness
	x	x	AgA	Interested in people's welfare, friendly vs. prefers lone intellectual contributions
		x	AgD	Trustful, confides in people vs. suspicious, keeps distance
	x	x	AgE	Friendly, likeable, outgoing vs. aloof, unpleasant, withdrawn
			Al	Alertness
		x	AlA	Alert to immediate surroundings, attentive vs. unaware, engrossed, absent-minded
			Au	Autistic Tendency
		x	AuA	Daydreams vs. has practical thoughts
		x	AuB	Anxiety leading to autistic thinking vs. relaxed, adjusted, realistic thoughts
			Ca	Calmness vs. Anxiety
		x	CaA	Relaxed, at ease vs. anxious, worried about self, edgy, nervous, tense, restless
		x	CaB	Takes time to think, deliberate vs. overreacts, impulsive, jittery
		x	CaC	Confident or optimistic about world vs. fears or worries about outside influences
			Co	Concentration
		x	CoA	Concentrates on study or reading vs. mind wanders, bored, forgets names
			De	Dependability
	x	x	DeB	Dependable, punctual, keeps promises vs. careless about promises and details
		x	DeC	Self-sentiment control, control of feelings vs. actions, thoughts swayed by emotions
	x	x	DeD	Conscientious, scrupulous vs. careless about doing what is right
			Do	Dominance
x		x	DoA	Takes charge socially, wants power vs. submissive, willing to serve
x		x	DoB	Egoistic, pushes own ideas vs. respects others' ideas, self-effacing
		x	DoC	Rights-conscious, complaining vs. tolerant
			Em	Emotional Maturity
		x	EmA	Patient, adjusts to frustration vs. verbally aggressive, demanding
		x	EmB	Modest, shuns attention, outwardly directed vs. seeks attention, egotistical
		x	EmC	Satisfied, cooperates with authority vs. asserts independence from authority, stubborn
			Es	Emotional Stability
		x	EsA	Emotionally stable, tolerant, stolid vs. emotionally sensitive, irritable
		x	EsB	Optimistic, faces problems vs. worrying, dwells on problems, escapist
		x	EsC	Healthy, feels vigorous vs. tired, intermittent loss of energy, hypochondriacal
		x	EsD	Life is good, life is worthwhile vs. feels frustrated dissatisfied
			Gs	Gregariousness
x		x	GsA	Likes to be with people physically vs. likes to be alone
x		x	GsC	Likes work or socializing with people vs. likes work alone or isolated activities
			Me	Meticulousness
	x	x	MeA	Meticulous, orderly, neat, particular about personal effects vs. messy, careless
			Mo	Morality
		x	MoA	Law-abiding, obedient, well-mannered, patriotic vs. free, progressive, liberal
	x	x	MoB	Moral, knows right from wrong, resists temptation vs. pleasure seeking
	x	x	MoC	Generous, helpful, fair, gives to causes vs. selfish, uncharitable
			Na	Need for Achievement
	x	x	NaA	Likes to do his best, works hard, persists until successful vs. play before work
		x	NaB	Likes success in competition, likes getting ahead vs. dislikes competition
	x	x	NaC	Strives for accomplishment vs. no motivation to do good or to help people
			Ob	Objectivity vs. Paranoid Tendency
	x	x	ObA	Objectivity and fairness attributed to others vs. paranoid delusions about others
	x	x	ObB	Credit is given by others vs. blame by others is unfair
		x	ObC	Depends on others for help, advice, sympathy vs. not interested in others, independent

[1] Positive pole is presented first with negative following "vs".

[2] 38 and 22 variable analyses were done using separately scored poles and are presented in the present report; the 77 variable analyses were done on whole scales (i.e., summed across poles) and are reported in Dermen, et al.(1974).

TABLE I (continued)

Analysis			Variable	Factor and Subfactor Scale Description
22	38	77	Om	Open-Minded vs. Authoritarian
		x	OmA	Many philosophies, religious, political views reasonable vs. only one possible
		x	OmB	Respect for philosophies of others vs. belief in rightness or wrongness of principles
		x	OmC	Innovative, ready for new ideas, flexible vs. conservative, conventional, unchangeable
			Pe	Persistence
	x	x	PeA	Persistent, persevering, determined vs. quitting, needs change, gets discouraged
		x	PeB	Likes stable tasks, interests stable vs. likes changing tasks, interests change
	x	x	PeC	Conscientious, careful, exacting, tidy, orderly vs. relaxed, carefree, nonchalant
			Po	Poise vs. Self-Consciousness
x		x	PoA	Enjoys group attention, exhibitionistic, poised vs. dislikes being in front of people
x		x	PoB	Enjoys performing in public, likes speaking to group vs. dislikes performing in public
		x	PoC	Seeks comment from important people vs. self-conscious with superiors, avoids criticism
			Re	Relaxed vs. Nervous
		x	ReA	Physically relaxed vs. fidgets, has nervous habits, twitches, has restless movements
		x	ReB	Tolerant of nonhuman or situational annoyances vs. irritated by mishaps, frustrations
			Rt	Restraint vs. Rhathymia
		x	RtA	Planning vs. acting without thought, impulsive
		x	RtB	Serious, responsible vs. lively, carefree, irresponsible, no thought of the future
		x	RtC	Enjoys stable pursuits vs. wants excitement, change, wildness
			Sc	Self-confidence
		x	ScA	Feels confident vs. needs encouragement, feels inferior, afraid of failure
		x	ScB	Claims abilities, skills, good experiences vs. claims handicaps, ineptitude
		x	ScC	Sees others as positive toward him vs. sees others as negative toward him
			Se	Sensitive Attitude
	x	x	SeA	Warm, soft, cooperative, kind, considerate vs. hard, stern, bossy
	x		SeB	Sensitive, empathic, delicate, quiet vs. robust, noisy, active, tough, fearless
	x	x	SeC	Interest in people's welfare, religion vs. interest in people for companionship or fun
	x		SeD	Interest in imagination, music, aesthetics vs. interest is practical, technical, political
			So	Sociability
x		x	SoA	Competent socially, social organizer vs. withdrawn, fears public speaking
x		x	SoB	Glib talker, superficial social know-how vs. aloof, doesn't know what should be said
x		x	SoC	Experienced or confident in social contacts vs. shy, socially insecure
			Ss	Self-Sufficiency
x		x	SsA	Self-sufficient, likes to be alone in stress, planning vs. dependent, needs others
		x	SsB	Desires to be different, individualistic, free vs. needs approval, conforms
		x	SsC	Unconventional, idealistic vs. tends to have same feelings as others, majority opinions
x		x	SsD	Emotionally independent vs. needs love, friends, succorance, and protection
			Su	Surgency vs. Repression
	x	x	SuA	Exuberant, enthusiastic, cheerful vs. repressed, reserved, inhibited
		x	SuB	Likes to stimulate and cheer up people vs. quiet, stay-at-home
	x		SuC	Expressive, frank, talks without inhibition vs. cautious in talking, precise, secretive
			Th	Thoughtfulness
		x	ThA	Likes to reflect, meditate vs. prevented from doing it by social or business activity
		x	ThB	Likes to think about people vs. enjoys the company of people without analyzing them
		x	ThC	Thinks about self vs. carefree about self
		x	ThD	Intellectual interests vs. active interests
			To	Tolerance of Human Nature and Things vs. Criticalness
		x	ToA	Naive, believes people honest and fair vs. believes people are unfair to gain advantage
		x	ToB	Believes people are capable of good work vs. critical, fault finding
		x	ToC	Tolerant of human nature vs. cynical about human nature
		x	ToE	Tolerate imperfections in things vs. feels hostility toward things that fail to work
			Wb	Well-Being vs. Depression
		x	WbA	Has feeling of well-being, happy vs. depressed, blue, lonely
		x	WbB	Hopeful, optimistic about own future vs. fear and worry about doom or vague dangers
		x	WbC	Confident, can stand criticism vs. guilt prone, feels worthless, worries about himself

In factor analyses of these data, just four factors out the 28 hypothetical ones emerged nearly as intended, with salient factor coefficients or weights on the particular scales that were written as markers for them. These factors are:

1. Open-mindedness vs. Dogmatism (Om)
2. Self-Confidence (Sc)
3. Thoughtfulness (Th)
4. Tolerance of Human Nature vs. Criticalness (To)

   (Tolerance of things was originally included in this factor but was omitted because of low loadings, although this concept occasionally seemed in the literature to be a part of the factor.)

Four more factors, numbered 5-8 below, yielded salient coefficients on at least three possible marker variables including at least one scale originally intended for the factor plus other scales originally proposed for other factors, but so close to the factor in psychological meaning that the new assignments for the subfactors were judged not to be inconsistent with the literature. These are instances where two or more factors supposedly matching those in the literature were clearly overlapping.

The attention of the reader is called here to the result that in both analyses the intended factor, Self-Sufficiency, was split into what we will call Individualism vs. Conformity (In), (No 7 below) and Self-Sufficiency vs. Dependence(Ss). A second look at the literature on this point revealed that this division of the factor actually represents the findings

of the literature more accurately than did a combining of these two concepts as a single factor of Self-Sufficiency in the original review (French, 1973).

In the case of the General Activity factor (No. 5 below), it should be mentioned that the best evidence for the markers listed is in a 25-factor solution done at the same time as the 22 factor solutions reported by Dermen et al. (1974). In the 22-factor analyses the factor containing the markers indicated below was too broad to be definable as the General Activity factor observed in the literature.

These four additional factors and their subfactors are shown below with symbols in parentheses to indicate the factors and lettered subfactors as originally assigned in the literature review (French, 1973). As a result of subfactor reassignments based on the Dermen et al (1974) studies, it is now being proposed that the scales listed below for these additional four factors will serve as suitable markers for the factors.

5. General Activity (Ac)

   (AcA) Moves rapidly, quick in physical performance vs. slow

   (AcB) Busy, active in projects or nonsocial affairs vs. Uninvolved, gets overburdened

   (EsC) Healthy, feels vigorous vs. Tired, intermittant loss of energy, hypochondriacal.

   Although originally intended for Emotional Stability, the association of this subfactor with General Activity is consistent with the literature.

6. Calmness vs. Anxiety (Ca)

   (CaA) Relaxed, stable, at ease vs. Anxious, worried about self, edgy, uneasy, nervous, tense, restless without cause

(AuB reflected) Relaxed, adjusted, realistic thoughts vs. Anxiety and worry that leads to autistic thinking

(ReA) Physically relaxed vs. Fidgets, has nervous habits, twitches, makes restless movements

Although hypothesized for three different factors, all of these subfactors seem quite suitable as markers for Calmness vs. Anxiety

7. Individualism vs. Conformity (In)

(Part of what was originally called Self-Sufficiency, Ss)

(SsB) Desires to be different, individualistic, free vs. Needs approval of others, conforms, accepts social order, agrees with group, likes affiliation

(SsC) Unusual ideas, unconventional, idealistic, reflective vs. Has majority opinions, tends to have same feelings as others

(EmC reflected) Asserts independence from authority, stubborn vs. Satisfied, cooperates with authority

8. Emotional Maturity (Em)

(EmA) Patient, adjusts to frustration vs. Verbally aggressive, demanding

(ReB) Tolerant of physical, non-human or situational annoyances vs. Irritated by mishaps and frustrating circumstances

(ToE) Tolerates the imperfections in things vs. Feels hostility toward things that fail to work

(EsA) Emotionally stable, tolerant, stolid vs. Emotionally sensitive, irritable.

Actually, these four subfactors seem more homogeneous in a psychological sense than are many variables with high loadings on Emotional Maturity in the literature.

Analyses of Separate Scales for Poles

It has been concluded that satisfactory marker variables for the eight factors described above consist of the subfactor scales given for them. It was surmised that satisfactory markers for at least some of the remaining hypothesized factors failed to appear due to constraints on the earlier analyses. As was noted above, scales had been defined in terms of opposite poles with some educated guesses to define an "opposite" even when the literature failed to show its existence (or its non-existence). An ideal procedure might have considered item analyses separately for each pole of a hypothesized scale as well as factor analyses of a matrix as large as 174 x 174 (87 defined subfactors x 2 poles). Both the item analyses by poles and factor analyses of such a large matrix were deemed impractical, especially given the relatively small sample sizes. In the item analyses actually done, scores had been summed across the two poles and items retained or discarded in terms of their correlations with the composite of the two poles. Subfactor scales had been, in turn, retained or discarded as a function of their homogeneity across the total of both poles. It is likely that these procedures diluted or contaminated some markers where one pole was on target but the other not. It also often produced scales that were not balanced in terms of the representation of the two poles, occasionally an entire pole having been eliminated. Because of these considerations, in the present analyses

the original full length scales were used, but scored separately by poles.

Two factor analyses were carried out: one with the 22 single-pole scales and one with 38 such variables. Both of these used the Naval recruit data.

Minres factor analyses were employed. These were followed by Direct Oblimin rotation, separately rotating 6 and 10 factors for the 22-variable study and separately rotating 6, 10 and 14 factors for the 38-variable study. Tables 2 and 3 consist of the rotated factor patterns and the matrices of correlations among the factors.

In the next section is a listing of ten additional factors found to be marked satisfactorily by at least three of the unipolar scales. The number of factors extracted and rotated made an important difference in the findings. Of some theoretical interest is the justification for selecting markers of a factor those variables that emerge together when few factors are considered rather than many. Conversely, some variables emerge together in a suitable way when many factors are considered rather than fewer. It may be argued that, because of the somewhat varying generality of the factors even among so-called "primary" factors, all of them may not behave similarly in a single analysis. As demonstrated by Taylor and Coyne (1973), hierarchical relationships among factors based on their generality can be revealed by rotating different numbers of factors even when all rotations are orthogonal. Tables 2 and 3 provide examples of these relationships. When relatively few factors are extracted and rotated, it is presumably the more general

TABLE 2

Factor Coefficients (over.25) and Intercorrelations: 22 Variables

	Description of Variable	6 factor solution						10 factor solution									
		1 Po	2 Ss	3 So	4 Gs	5	6	1	2	3	4	5	6	7	8	9	10
DoA+	Takes charge socially, wants power	50*					34	41							30		
DoA-	Submissive, willing to serve					81				102							
DoB+	Egoistic, pushes own ideas	33					31						41			48	
DoB-	Respects others' ideas, self-effacing			25			28					105					
GsA+	Likes to be with people physically			85*	31								38				60
GsA-	Likes to be alone				64*						29						
GsC+	Likes work or socializing with people				67*			34			47						
GsC-	Likes work alone or isolated activities				69*						82						
PoA+	Enjoys attention, exhibitionistic, poised	79*						76									
PoA-	Dislikes being in front of people	78*			25			77									
PoB+	Enjoys performing in public, public speaking	62*						64									
PoB-	Dislikes performing in public	85*						88									
SsA+	Likes to be alone in stress, planning		69*						58								
SsA-	Dependent, needs help of others		61*						71								
SsD+	Emotionally independent		65*						65								
SsD-	Needs love, friends, succorance, protection		53*				-27							100			
SoA+	Competent socially, social organizer	47		27			34	43							51		
SoA-	Withdrawn, fears public speaking	51*		31				45					30				
SoB+	Glib talker, has superficial social know-how			77*									81				
SoB-	Aloof, doesn't know what should be said			54*									55				
SoC+	Experienced or confident in social contacts	46		41				49					35				
SoC-	Shy, socially insecure	36		45*				48					33				

Factor Correlations

	1	2	3	4	5	6
1.	100	10	60	18	-24	20
2.		100	04	-31	09	04
3.			100	34	-11	10
4.				100	-17	07
5.					100	-03
6.						100

Factor Correlations

	1	2	3	4	5	6	7	8	9	10
1.	100	07	-28	14	42	62	-06	14	11	06
2.		100	07	-23	16	02	48	-12	18	-20
3.			100	-16	-17	-13	10	01	04	00
4.				100	12	27	-40	-01	-07	37
5.					100	41	-01	09	15	05
6.						100	-10	06	-11	12
7.							100	-08	-07	-12
8.								100	13	-08
9.									100	-09
10.										100

Decimals omitted

* Indicates suggested markers

TABLE 3

Factor Coefficients (over .25) and Intercorrelations: 38 Variables

	Description of Variable	6 factor solution						10 factor solution										14 factor solution													
		1	2	3	4	5	6	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	11	12	13	14
			Su		Se			De							Pe			Me		Ob											
AgA+	Interested in people's welfare, helpful				43•												48										41				38
AgA-	Prefers lone intellectual contributions					45						65										65									
AgE+	Friendly, likeable, outgoing		33		25							29								25				30							31
AgE-	Aloof, unpleasant, withdrawn	41	33			33						26				26	42					40									
DeB+	Dependable, punctual, keeps promises	62						66•																	63						
DeB-	Careless about promises and details	84						66•								25									45						
DeD+	Conscientious, scrupulous	64						48•																	48						
DeD-	Careless about doing what is right	64						28								34		27							28						
MoB+	Moral, knows right from wrong	32					37																25								
MoB-	Pleasure seeking	46						35																							
MoC+	Generous, helpful, fair, gives to causes						46							48														62			
MoC-	Selfish, uncharitable				53•	47					66		32											71							
PeA+	Persistent, persevering, determined	40					28								53•		28					99									
PeA-	Quitting, needs change, gets discouraged	34					38								59•												33		29		
PeC+	Conscientious, careful, exacting, tidy	72						28							25	31		32•											41		
PeC-	Relaxed, carefree, nonchalant						47						82																		
MeA+	Meticulous, orderly, neat, careful	51														75		80•					82								
MeA-	Messy, careless, impulsive	56														50		80•													
NaA+	Likes to do his best, works hard	58					29								30		36										96				
NaA-	Play before work	46	-39				51								67•														86		
NaC+	Strives for accomplishment	27					34							37										31							
NaC-	No motivation to do good/help people	26		-30	51•		30			-31	51			29																	
ObA+	Objectivity,fairness attributed to others			60						63									57•												
ObA-	Paranoid delusions about others	26		54						61									80•				-29								
ObB+	Credit is given by others			69						74									69•												
ObB-	Blame by others is unfair			65						73									72•												
SeA+	Warm, soft, cooperative, kind,considerate	26			47•						42																		63		
SeA-	Hard, stern, bossy				41•				-41									-40													
SeB+	Sensitive, empathic, delicate, quiet				49•						58																		75		
SeB-	Robust, noisy, active, tough, fearless		-46						-52									-52													
SeC+	Interest in people's welfare, religion				38			26						44														52			
SeC-	Interest in people for companionship, fun			-28										29																	-48
SeD+	Interest in imagination, music, aesthetics		35			-32								42	-26				35												-34
SeD-	Interest is practical, technical,political		-26			46								-53						25			-42								
SuA+	Exuberant, enthusiastic, cheerful		50•					32		27		32			-31						28										
SuA-	Repressed, reserved, inhibited		57•					28	46									45							39						
SuC+	Expressive, frank,talks without inhibition		74•					-28	71				-25	30				73							26						
SuC-	Cautious in talking, precise, secretive			43		30				46				-45	32		-38								-30						
																										104					

Decimals omitted

• Indicates suggested markers

Factor Correlations

	1	2	3	4	5	6
1	100	33	25	32	-22	51
2		100	17	16	-01	14
3			100	24	04	04
4				100	-08	18
5					100	-12
6						100

Factor Correlations

	1	2	3	4	5	6	7	8	9	10
1	100	04	05	05	04	06	18	19	14	06
2		100	07	04	10	-02	02	-03	06	06
3			100	12	06	-08	09	02	07	14
4				100	08	-05	13	04	02	13
5					100	02	03	01	04	06
6						100	03	09	07	-05
7							100	12	12	10
8								100	10	03
9									100	09
10										100

Factor Correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	100	08	08	-05	07	08	06	15	01	12	10	09	11	-06
2		100	08	-01	12	-02	09	06	-09	05	06	-03	11	01
3			100	09	07	-11	17	12	-11	09	00	00	14	07
4				100	08	-07	04	-02	-12	-04	01	-09	02	06
5					100	-04	07	07	-04	03	03	-01	08	02
6						100	-01	01	15	02	08	03	-04	-07
7							100	13	-11	15	10	04	19	-02
8								100	-02	15	08	04	11	-02
9									100	-06	-05	05	-09	-02
10										100	08	11	16	04
11											100	04	16	-05
12												100	06	07
13													100	03
14														100

ones that are separated clearly, while more specific factors may merge with one another. When a larger number of factors is extracted and rotated, the more general ones may break up, while the relatively specific factors are satisfactorily separated.

Unipolar Markers for Ten Additional Factors

In the list below are the symbols and names of factors as they were originally hypothesized and as they are listed in Table 1. Also the positive or negative direction of each pole is noted. The first four factors come from Table 2 and the last six from Table 3.

9. Gregariousness (Gs)

(GsA-) Likes to be alone

(GsC+) Likes work or socializing with people

(GsC-) Likes work alone or activities that are isolated

10. Poise vs. Self-Consciousness (Po)

(PoA+) Enjoys group attention, exhibitionistic, poised

(PoA-) Dislikes being in front of people

(PoB+) Enjoys performing in public, feels pride in speaking to a group

(PoB-) Dislikes performing in public

(DoA+) Takes charge socially, wants power

(SoA-) Withdrawn, fears public speaking and social responsibility

11. Sociability (So)

(SoB+) Glib talker, has superificial social know-how

(SoB-) Aloof, does not know what should be said

(SoC-) Shy, socially insecure

(GsA+) Likes to be in the presence of people

12. Self-Sufficiency vs. Dependence (Ss)

(SsA+) Self-suficient, likes to be alone in stress, in planning, or in facing problems

(SsA-) Dependent, needs help from others, group dependent

(SsD+) Emotional independence

(SsD-) Needs love, friends, succorance, and protection

13. Dependability (De)

(DeB+) Dependable, punctual, keeps promises

(DeB-) Careless about promises and details

(DeD+) Conscientious, scrupulous

14. Meticulousness (Me)

(MeA+) Meticulous, orderly, neat, careful, particular about personal effects

(MeA-) Messy, careless, impulsive

(PeC+) Conscientious, careful, exacting, tidy, orderly

15. Objectivity vs. Paranoid Tendency (Ob)

(ObA+) Objectivity and fairness attributed to others

(ObA-) Paranoid delusions about others

(ObB+) Credit is given by others

(ObB-) Blame by others is unfair

16. Persistence (Pe)

(PeA+) Persistent, persevering, determined

(PeA-) Quitting, fickle, needs change, gets discouraged

(NaA-) Play before work

17. Sensitive Attitude (Se)

(SeA+) Warm, soft, cooperative, kind, considerate

(SeA-) Hard, stern, bossy

(SeB+) Emotionally sensitive, empathic, delicate, quiet

(AgA+) Interested in people's welfare, helpful

(MoC-) Selfish, uncharitable

(NaC-) No motivation to do good or to help people

18. Surgency (Su)

(SuA+) Exuberant, enthusiastic, cheerful

(SuA-) Repressed, reserved, inhibited

(SuC+) Talks without inhibition, expressive, frank

The ten factors listed above are revealed by the analyses presented in Tables 2 and 3. Their symbols appear in the tables beneath the factor numbers. No effort will be made to give names to the other factors in those tables. However, a discussion of some of the detailed findings in the tables may be useful.

Discussion of the Factor Patterns

Table 2 shows the factor pattern coefficients for the 22 variables when 6 and 10 factors are extracted and rotated. The + or - designation on a variable indicates the direction of the pole. The abbreviations are those presented in Table 1 and also correspond to the categories in

the report by French (1973). Table 3 gives the factor patterns for the 38-variable set when 6, 10, and 14 factors are extracted and rotated. The variables that were suggested as factor markers in the preceding section of this report are identified by asterisks placed to the right of the salient weights in the "best-fitting" solution.

This discussion of the tables is intended to explain some of the evidence on which unipolar markers were selected for ten of the putative factors. In addition, it is desirable to make clear to the readers to what extent, if any, there exists capitalization on chance, because some markers are selected from solutions where rather few factors are rotated and some are selected from solutions presenting a larger number of factors. While a theoretical discussion of the estimation of the number of dimensions in a matrix is not appropriate here, it is clear from these results that different factors become visible when different numbers of dimensions are considered.

Let us look first at Table 2, which shows the factor patterns of the 22 variables for six and ten factors. It happens that four of our hypothesized factors were revealed most clearly by the 6-factor solution.

The unipolar variables for Poise vs. Self-Consciousness and for Sociability were placed together in this analysis, because they are often found separately in the literature, but were combined on the same factor in Dermen et al. (1974). It turned out that analyzing the separate poles of the subfactors for these two factors was successful in that the two factors appear as distinct but rather highly correlated in the two analyses in Table 2. Some useful looking markers for both of

these factors were originally intended in French (1973) for other factors, but, as shown by the variable descriptions given, the change in their assignments as markers is not only consistent with the present results but also makes good psychological sense.

Now look at Factor 2 in the 6-factor solution in Table 2. This factor is determined by the two poles of the two subfactors of Self-sufficiency vs. Dependence found in both samples in Dermen et al. (1974). The purpose of putting the two poles of each of these two subfactors into this analysis was to provide four variables that might be used as markers. This objective was met very well in the 6-factor solution, while an increased number of factors permitted the freedom for one member of this group to split away and become a specific factor (Factor 7 in the 10-factor solution which correlates .48 with the original factor). Nevertheless, it is being suggested that all four of these poles may be used as markers for the factor.

The factor Gregariousness is found in the 6-factor solution in Table 2, being represented by just three of the four unipolar variables that had been provided for it in this analysis. Here is an instance where unipolar scales intended to be opposites are found not to be opposed accurately enough to appear on the same factor. Indeed the anticipation of such instances was good reason to make factor analytic studies of at least some of these separate unipolar scales. Three markers for a factor is minimal but satisfactory, and so the three unipolar variables having high weights on Gregariousness are suggested as markers for that factor. Look also at this factor in the 10-factor

solution. It might have been Factor 4, but spreading the variance over a larger number of factors has had the effect of breaking off one of the three markers and making it a specific factor, Factor 10.

Table 3 illustrates similar phenomena with the group of 38 variables. Surgency has three good markers in the 6-factor solution, but one of these is broken among several factors when a greater number of factors is rotated. Sensitive Attitude, having here an emphasis on social helpfulness, seems a little more specific than are most of its appearances in the literature. It has some good markers not originally intended for it. The factor is clearest with six factors, but can also be seen as Factor 4 in the 10-factor solution. Dependability is confused with other factors in the 6-factor solution, probably because too few dimensions are represented in that analysis to separate it. This factor is clearest in the 10-factor solution, but is also quite visible as Factor 8 in the 14-factor solution. Persistence follows a similar pattern in the 6-factor solution; clearest in the 10-factor solution and loses one of its markers in the 14-factor solution. Meticulousness is also confused with other factors in the 6-factor analysis but is clear in the other two analyses. Objectivity vs. Paranoid Tendency was found to have only two salient markers in Dermen et al. (1974), and so its separate poles were placed in this analysis in order to obtain evidence for a sufficient number of markers. Its presence is clear in all of the 38-variable analyses, being clearest in the 14-factor solution.

The intercorrelations among the factors are shown with each table mainly for purposes of completeness. The highest of these values are

correlations around .60 shown in Table 2 between Poise vs. Self-Consciousness and Sociability. It is this correlation that caused these factors to merge in the analyses of the full subfactor scales. Such a close relationship between these two factors is evidence for the second-order factor that has been found often in the literature and called "extraversion" or a similar name. In this same table there is substantial correlation between the above-named factors and a specific factor originally intended as a negative pole of a marker for Dominance: (DoA) Respects others' ideas, self-effacing. Possibly the items written for this scale had too much of an anti-sociability or self-consciousness slant. The 6-factor analysis in Table 3 shows a correlation of .51 between two factors characterized by a confusion of factors including Morality, Persistence, and Need for Achievement. This suggests the effect of some sort of "good guy" factor at the second-order level.

As noted above, it is likely that the factors revealed most clearly when dimensionality is held to a low level are rather general ones, while those revealed by using a larger number of dimensions are more specific in nature. However, we cannot be very confident about the generality of a given factor, because this characteristic depends so much on the particular mix of variables or other qualities of the analysis. While it will be useful to warn users of any extremes in the generality of factors that our markers may generate, we should probably not eliminate factors or markers for such factors merely on the basis of differences of this kind. In particular, it is stressed here that the mix of variables

or other characteristics of our own analyses should not be allowed to negate or grossly alter the repeated findings of other workers who have published their results in the literature of factor analysis. We hope that our final "Guide", subject to our own factorial tryouts, will accurately represent a concensus of the findings in the literature of self-report questionnaires that attempt to measure temperamental characteristics.

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